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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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EXAMINER	
DUONG, THOI V	

ART UNIT	PAPER NUMBER
2871	

DATE MAILED: 09/20/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/726,942	LU, MINHUA	
	Examiner	Art Unit	
	Thoi V. Duong	2871	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *03* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *11 July 2005*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1,3-12 and 14-22* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1,3-12 and 14-22* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

1. This office action is in response to the Amendment filed July 11, 2005.

Accordingly, claims 1, 3, 11, 12, 14 and 22 were amended, and claims 2 and 13 were cancelled. Currently, claims 1, 3-12 and 14-22 are pending in this application.

Response to Arguments

2. Applicant's arguments with respect to claims 1 and 12 have been considered but are moot in view of the new ground(s) of rejection.

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

4. Claims 1, 3, 5, 9, 11, 12, 14, 16, 20 and 22 are rejected under 35 U.S.C. 103(a) as being unpatentable over Walker et al. (Walker, USPN 6,275,277 B1) in view of Lee (USPN 6,844,911 B2).

Re claims 1 and 12, Walker discloses a method (as well as an arrangement) for the spacerless filling of liquid crystals to form liquid crystal cells 160 on a silicon backplane 115 or microdisplays (col. 5, lines 3-27), said silicon backplane being a semiconductor wafer having said liquid crystal cells formed thereon in a closely spaced array (Figs. 2 and 7, and col. 5, lines 22-27), said method comprising:

forming spacer walls 150 on said silicon backplane 115 to provide a plurality of cells 160 surrounding active liquid crystal display areas 155 (Figs. 7 and 8 and col. 7, lines 12-20);

laminating a top layer material 155 to said silicon backplane 115 (Fig. 10);

dispensing into each of said active liquid crystal display areas 155 within spacer walls 150 with an exact amount of liquid crystals (Figs. 16 and 17); and

dicing said silicon backplane 115 along scribe lines 248, 250 to form individual liquid crystal cells 23 (Figs. 23-25).

As shown in Figs. 7-9, Walker discloses a method for the spacerless filling of liquid crystals to form liquid crystal cells on a silicon backplane 115 that is basically the same as that recited in claims 1 and 12 except for introducing a curable sealant into gaps externally of said spacer walls so as to fill said gaps with said sealant.

As shown in Figs. 3 and 4, Lee discloses a method for fabricating liquid crystal cells comprising:

introducing a curable sealant (dummy seal pattern 74) into gaps 64 externally of spacer walls 72 so as to fill said gaps with said sealant (col. 2, lines 54-60); and

curing said sealant and dicing glass substrate 60 through said gaps 64 so as to form individual liquid crystal-filled cells (col. 3, lines 12-23 and col. 6, lines 40-43).

Thus, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the method of Walker with the teaching of Lee by introducing a curable sealant into gaps externally of the spacer walls to fill said gaps with said sealant for not only protecting said spacer walls but also preventing a

breakdown of the glass substrate during cutting process (col. 3, line 67 through col. 4, line 4).

Re claims 3 and 14, as shown in Fig. 7, Walker discloses that the spacer walls 150 are configured to form essentially rectangular liquid crystal cells (Fig. 4).

Re claims 5 and 16, Walker discloses that the top layer material 100 comprises a glass window 102 of a size commensurate with the size of said silicon backplane 115 as shown in Fig. 34 (col. 4, lines 54-58).

Re claims 9 and 20, as shown in Fig. 10, Walker discloses the surfaces of substrates 115 and of said top layer material 100 facing said spacer walls 150 are each provided with a layer of an alignment material 135 (col. 5, lines 57-60).

Re claims 11 and 22, as shown in Figs. 8 and 9, Walker discloses arranging discrete spacer posts or balls 152 in the areas between said spacer wall 150 containing said sealant so as to mechanically strengthen said liquid crystal displays (col. 9, lines 5-32).

5. Claims 4, 7, 8, 15, 18 and 19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Walker et al. (Walker, USPN 6,275,277 B1) in view of Lee (USPN 6,844,911 B2) as applied to claims 1, 3, 5, 9, 11, 12, 14, 16, 20 and 22 above and further in view of Liao et al. (Liao, USPN 6,681,005 B2).

The method of Walker as modified in view of Lee above includes all that is recited in claims 4, 7, 8, 15, 18 and 19 except for the cell size, the thickness of the spacer walls, and a selective pressure applied to said spacer walls during introduction of said sealant into said gaps so as to facilitate control over the uniformity of said gaps

about the liquid crystal cells and to provide a support for the silicon backplane during the assembly of said cells.

Re claims 4 and 15, Liao discloses a LCOS panel consisting of a glass substrate 102 and a silicon substrate, wherein the LCOS panel has a general panel size of 0.7 inch (17.5 mm), 0.9 inch (22.5 mm) or 1.3 inch (32.5 mm) (col. 2, lines 4-27).

Re claims 7 and 18, as shown in Figs. 6-8, Liao discloses a process for forming a uniform cell gap, wherein a local pressure is applied to a spacer wall 606 from a hot press apparatus including hot plates 702, 704 and cushions 706, 708 (col. 5, line 36 through col. 6, line 20),

wherein, re claims 8 and 19, the uniform cell gap is approximately 15-20 micrometer (col. 5, lines 39-42). Accordingly, the spacer wall 606 also has the same thickness as the cell gap.

Thus, it would have been obvious to one having ordinary skill in the art at the time the invention was made to further modify the method of Walker with the teaching of Liao by applying selective pressure to said spacer walls during introduction of said sealant into said gaps so as to facilitate control over the uniformity of said gaps about the liquid crystal cells and to provide a support for the silicon backplane during the assembly of said cells (col. 5, line 36 through col. 6, line 20).

6. Claims 6 and 17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Walker et al. (Walker, USPN 6,275,277 B1) in view of Lee (USPN 6,844,911 B2) as applied to claims 1, 3, 5, 9, 11, 12, 14, 16, 20 and 22 above and further in view of Cohn (Pub. No. US 2002/0179921 A1).

The method of Walker as modified in view of Lee above includes all that is recited in claims 6 and 17 except for the spacer walls being formed lithographically on the silicon substrate. However, the lithographical process for forming sealant structures (spacer walls) on the silicon substrate is well known in the art as disclosed by Cohn to seal two substrate together (paragraphs 11 and 53).

Thus, it would have been obvious to one having ordinary skill in the art at the time the invention was made to lithographically form the spacer walls on the silicon substrate as taught by Cohn to improve seal reliability and performance (paragraph 62).

7. Claims 10 and 21 are rejected under 35 U.S.C. 103(a) as being unpatentable over Walker et al. (Walker, USPN 6,275,277 B1) in view of Lee (USPN 6,844,911 B2) as applied to claims 1, 3, 5, 9, 11, 12, 14, 16, 20 and 22 above and further in view of Brosig et al. (Brosig, USPN 5,106,441).

As shown in Figs. 14, 16 and 17, Walker discloses that the dispensing of said liquid crystals and lamination are implemented under a vacuum (column 10, line 60 through col. 12, line 12) except for the dispensing of sealant.

However, Brosig also discloses a similar process for manufacturing a liquid crystal cell comprising implementing the dispensing of said liquid crystals and sealant and lamination under a vacuum (col. 1, line 60 through col. 2, line 15).

Thus, it would have been obvious to one having ordinary skill in the art at the time the invention was made to further modify the method of Sojourner with the teaching of Brosig by implementing the dispensing of liquid crystal and sealant and lamination

under a vacuum to eliminate the evacuation time and obtain a stable cell (col. 1, lines 53-57 and col. 2, lines 12-13).

Conclusion

8. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Thoi V. Duong whose telephone number is (571) 272-2292. The examiner can normally be reached on Monday-Friday from 8:30 am to 4:30 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Robert Kim, can be reached at (571) 272-2293.

Thoi Duong

09/15/2005

ROBERT KIM
SUPERVISORY PATENT EXAMINER